

ORIGINAL ARTICLE

Total Antioxidant Capacity and Levels of Epidermal Growth Factor and Nitric Oxide in Blood and Saliva of Insulin-Dependent Diabetic Patients

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Background. The aim of this study was to examine how type 1 diabetic patients have altered levels of lipid peroxidation, antioxidant defense, NO and EGF in their plasma and saliva. We tested the differences in lipid peroxidation level, antioxidant power, and concentrations of epidermal growth factor (EGF) and nitric oxide (NO) in saliva and blood of type 1 diabetic subjects in comparison to healthy control subjects.

Methods. Nineteen subjects with type 1 diabetes mellitus and 19 healthy age- and sex-matched control subjects were included in the study. Blood and saliva samples were obtained and analyzed for thiobarbituric reactive substances (TBARS) as a marker of lipid peroxidation, ferric reducing ability (total antioxidant power), EGF and NO levels.

Results. TBARS levels did not show a significant difference between the two groups. Analysis of antioxidant power revealed that saliva and plasma of diabetic patients had more antioxidant power ($p < 0.01$) than the healthy control population (107 ± 10.35 vs. 11.14 ± 4.66 and 192 ± 12.3 vs. 142 ± 15.2 mmol/L, respectively). Concentration of EGF was increased ($p < 0.01$) in saliva whereas it was reduced ($p < 0.01$) in plasma of diabetic patients in comparison to those of healthy subjects (2423 ± 322 vs. 1513 ± 341 and 125 ± 14 vs. 346 ± 60 pg/mL, respectively). NO level increased in both saliva and plasma of diabetic patients in comparison to those of healthy subjects (46.61 ± 7 vs. 72.89 ± 13 and 62.11 ± 4.6 vs. 76.25 ± 5 μ mol/L, respectively). Blood HbA1c (%) of patients was significantly higher than that of controls (8.3 ± 0.32 vs. 5.4 ± 0.24 , $p < 0.01$).

Conclusions. Existence of increased total antioxidant power in the presence of normal lipid peroxidation in plasma and saliva of type 1 diabetic patients indicates the existence of oxidative stress. Increased salivary EGF and NO levels in association with elevated TAOP is interesting and should be further studied. © 2005 IMSS. Published by Elsevier Inc.

Key Words: Diabetes type 1, Oxidative stress, Nitric oxide, Epidermal growth factor, Blood, Saliva.

Introduction

Diabetes is a prevalent systemic disease affecting a significant proportion of the population worldwide. The effects of diabetes are devastating and well documented. There is increasing evidence that in certain pathologic states, espe-

cially chronic diseases, the increased production and/or ineffective scavenging of reactive oxygen species (ROS) may play a critical role (1,2). High reactivity of ROS determines chemical changes in virtually all cellular components, leading to lipid peroxidation. Production of ROS and disturbed capacity of antioxidant defense in diabetic subjects have been reported (3–5).

Diabetes has also been shown to be associated with endothelial dysfunction (6,7). One endothelial function is the synthesis of nitric oxide (NO) that is responsible for the endothelial vasorelaxation and inhibition of platelet adhesion. A number of studies have shown that vascular relaxation in

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